DESCRIPTIONS OF A NEW SUBGENUS AND NEW SPECIES OF ARVICOLINE RODENTS FROM BRITISH COLUMBIA AND WASHINGTON.

BY SAMUEL N. RHOADS.

Tetramerodon[1] subgen. nov.

Type *Arvicola* (*Tetramerodon*) *tetramerus* Rhoads, sp. nov., Victoria, B. C.

Subgeneric characters.—Dentition as in the subgenus *Mynomes* Rafinesque[2] as restricted by Dr. Coues (Mon. N. Amer. Rodentia, 1877, p. 153), but differing therefrom in the middle upper molar lacking a postero-internal trianglar loop. This tooth is composed of an anterior loop, a closed antero-exterior triangle, a closed median inner triangle, and a postero-exterior triangle. Other characters as in *Mynomes*. See, below, dentition of *A. borealis*, Fig. 1.

This section of the genus *Arvicola* includes a larger number of species than any other, whereas typical *Mynomes* is restricted to very few. Among those which class under *Tetramerodon* may be mentioned *A. xanthognathus, chrotorrhinus, borealis, longicaudus, alticolus, mogollonensis, mordax, nanus, macropus, pauperrimus, townsendi, tetramerus* (l. c.), *edax, phœus*, and *operarius*.

Of *Mynomes* we have *A. pennsylvanicus, terrænovæ, aztecus*, and *drummondii?*

Prof. Baird characterized the subgenus *Hemiotomys* (= *Myonomes* of Coues) as having the middle "upper molar with five closed triangles, the last two sometimes subconfluent," taking no notice of the species then known, as *edax, townsendi, xanthognathus*, and *borealis*, in which, to a greater or less degree, the posterior triangle shows no indication of the subdivision seen in *A. pennsylvanicus*. The four-triangled species greatly outnumber those which possess five, and it is fully in accord with the system that they should be either separated subgenerically from *Mynomes* or that this subgenus be recharacterized.

[1] From *Tetrameres* = four-parted, and *Odous* = tooth.

[2] Dr. Coues' reasons for changing Rafinesque's original spelling to *Myonomes* are insufficient. If retained at all, it must remain *Mynomes*.

If the latter course be adopted, we still have an inexact diagnosis to accommodate the three or four exceptional species which develop the fifth triangle, and the name *Mynomes*, based by Rafinesque on a five-triangled species, becomes inapplicable. On this account, it seems to me quite consistent with the exact subdivision of the other members of the genus *Arvicola*, as well as necessary, that the subgenus *Tetramerodon* be adopted.

Arvicola (Tetramerodon) tetramerus sp. nov. Type No. 327, ad., ♂, Coll. of S. N. Rhoads, Beacon Hill Park, Victoria, British Columbia, May 19, 1892. Coll. by S. N. R.

Description.—Size medium, about the same as *A. pennsylvanicus*. Tail rather long. Color above, grizzled blackish-brown, beneath clear ash. Feet grayish-brown. Tail bicolor, matching corresponding surfaces of body, well-haired and penicillate.

Dentition as in *Mynomes*, but lacking the posterior fifth section of middle upper molar, typical of that subgenus.

Measurements (of type).—Total length, 170 mm; tail vertebræ, 50; hind foot, 23. Average of five adults—Total, 175; tail, 48; foot, 22. Skull—Total length, 26·5; basilar length, 24; zygomatic breadth, 15; length of nasals, 7·5; incisors to post-palatal notch, 14·2; interorbital constriction, 3·4; length of mandible, 16; width of mandible, 8·5.

Ten specimens of this species were taken in the suburbs of Victoria, in the dry, grassy woods of Beacon Hill Park, overlooking the Strait of Fuca.

They most nearly resemble *townsendi* from Puget Sound in essential characters. Compared with *townsendi* the Victoria voles may be readily distinguished by their much smaller size, blacker coloration above, the greater relative width of the interorbital region, the supraorbital ridges never meeting medially as in old *townsendi*, and the posterior margins of the frontals being rounded and but slightly encroaching upon the parietals. This species differs essentially from *A. occidentalis* and *A. californicus* as defined by Baird in its lack of red or yellow tints. From *A. montanus* Peale (fide Baird) *tetramerus* differs in the greater relative length between the upper molars and incisors, also in the posterior upper molar having four outer, salient angles instead of three. Prof. Baird states there is a great similarity between the colors of *montanus* and *edax* and that the former is grayer than *townsendi*. In *tetramerus* the colors are much darker.

Evotomys pygmæus sp. nov. Type No. 247, ad. ♀, Coll. of S. N. Rhoads, mouth of Nisqually River, Pierce Co., Washington. Col. by S. N. R.

Description.—Size smallest of any described species of the genus. Color above a rusty gray, lighter than *gapperi*, darkest along the top of head and back; sides and belly muddy ash-gray. Margins of ears and upper third of tail sooty. Feet light gray. Skull short and wide, with relatively wide and flaring zygoma and brain case and broad interorbital region. The audital bullæ are very much inflated, spheroidal, separated medially by less than 1 mm., their greatest transverse diameter being only 1 mm. less than the longitudinal. The dentition is intermediate between that of *E. occidentalis* and *E. californicus*, with the anterior lower molar of *californicus* and the posterior upper molar of *occidentalis*. In the latter case, however, the two anterior lateral triangles are completely closed in *pygmæus*, the second not connecting with the third as figured by Dr. Merriam[3] for *occidentalis*. The nasals do not reach the posterior points of the premaxillaries by 1½ mm.

Measurements.—Total length, 120 mm; tail vertebræ, 34; hind foot, 16. Skull—Total length, 21; basilar length, 18·4; zygomatic width, 12; length of nasals, 6; incisors to post-palatal notch, 9; interorbital constriction, 4·1; length of mandible, 12.

The single specimen on which I have based the above diagnosis is the only one of the genus secured by me in the Pacific coast district of the northwest. It was captured under a log in the dense spruce forest which covers the bluff overlooking Puget Sound, at the mouth of the Nisqually River. It is fully adult, with well-worn teeth. This species may be known externally from its nearest geographic congeners by its small size. In color it is much lighter than *occidentalis*, and (from the description) even paler than *californicus*.

Evotomys gapperi saturatus subsp. nov. Type No. 483, ad. ♀, Coll. of S. N. Rhoads, Nelson, British Columbia, Aug. 17, 1892. Col. by S. N. R.

Description.—Size and proportions of *E. gapperi*, but much darker, the "red" of back being dark chestnut, the sides and belly dark grayish-plumbeous without ochraceous tints of *gapperi*. The upper half of tail sooty black, strongly defined against gray of lower half. Compared with that of *gapperi*, the skull is relatively narrower, the nasals longer, the nasal premaxillary processes reach-

[3] N. Amer. Fau., No. 4, Plate II, Figs. 1 and 2.

ing considerably behind base of nasals; the audital bullæ are also narrower, elongate, and depressed.

The dentition does not differ from that of *gapperi*, but the other characters of the skull of type, as above defined, show such considerable differences from *gapperi* of eastern Canada that the question of its specific value is yet an open one.

Measurements.—Total length, 141 mm; tail vertebræ, 41; hind foot, 19. Skull—Total length, 23·3; zygomatic width, 12·1; length of nasals, 6·5; incisors to post-palatal notch, 10; interorbital constriction, 4·2; length of mandible, 13·2; width of mandible, 6·2.

One female (the type) was trapped on the banks of a small stream flowing into Kootenai Lake, in the town limits of Nelson, in the Selkirk Mountains. Two others were taken in the Rocky Mountains, at Field, on the banks of the Kicking Horse River.

Evotomys [*gapperi*] *dawsoni* Merriam, the west Arctic representative, differs from *saturatus* in the opposite light phase of coloration, a parallel case to that exhibited by the Hudsonian Chickadees, *Parus hudsonicus*, *P. h. stoneyi*, and *P. h. columbianus*.

Notes on Boreal Arvicolas of Uncertain Status.

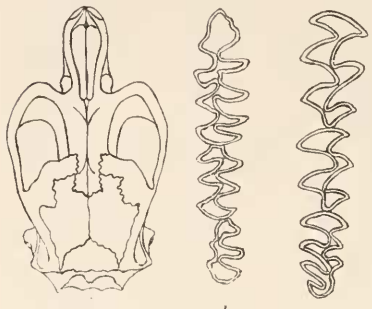
Arvicola borealis Richardson. Rich., Zool. Jour., No. 12, 1828, 517; Faun. Bor. Amer., I, 1829, 127. Aud. and Bach., Quad, N. Amer., 1854, 134.

Since the publication of the Monograph of North American Rodentia, this species has been classed, on the authority of Dr. Coues, as a subspecies of *Arvicola pennsylvanicus*. Several specimens from the material examined by Dr. Coues in the preparation of his monograph of the Arvicolinæ were subsequently presented to the Academy of Natural Sciences. Among them I find two skins with skulls and one specimen in alcohol enumerated in Dr. Coues' tabulated lists of Arctic Arvicolas, which, after a careful study of Richardson's two descriptions of *A. borealis*, I am convinced should be referred to that species. The characters exhibited by these specimens are those of an animal quite distinct from *pennsylvanicus* and justify restoring *borealis* to the full specific rank originally given it.

Audubon and Bachman (sup. cit.) have clearly restated the external characters of this vole from a personal examination of Richardson's types.

Its cranial characters remain undefined, and may be described as follow:—

Arvicola borealis. Topotype, No. 1,908, ad. ♀, Coll. of Acad. Nat. Sci., Phila. (No. 8,403, Sm. Inst.; vid. Coues, N. A. Rod., p. 206, t. li). Fort Anderson, North of Great Bear Lake (no date), R. McFarlane, Collector.



a *b* *c*

Fig. I. Skull and molar teeth of *Arvicola borealis* Rich.

a. Upper profile of cranium.[4] *b*. Left mandibular series. *c*. Left maxillary series.

Skull.—Remarkably angular, shallow and flattened, its anterior jugal breadth exceeding the squamosal, much as in *Synaptomys*. Posterior ends of frontals produced in a long, slender, strap-shaped process, beginning just behind the interorbital constriction, between the projecting anterior corners of the squamosal bones and terminating in a dove-tailed process between the acutely pointed and extended anterior corners of the parietals. Interorbital constriction narrow, acutely compressed, its single median ridge depressed below the frontal plane. Audital bullæ subtriangular, depressed, long and narrow. Dentition as given (l. c.) for the subgenus *Tetramerodon*, of which, with *A. xanthognathus* and *A. chrotorrhinus*, it forms a typical representative in the lack of any attempt at a posterior inner fold, or angle, in the middle upper molar. The anterior trefoil of the first lower molar is less deeply indented than in any *Arvicola* I have examined. The mandibles present no peculiar characters. An incipient groove can be detected, almost evenly dividing the face of each upper incisor.

Arvicola drummondi Aud. and Bach.

Five specimens of meadow mice, three taken on the shores of Lac La Hache, B. C., and two from the valley of the Kicking Horse River, at Field, B. C., I had previously described in manuscript as new, under the name *Arvicola* (*Mynomes*) *microcephalus*.

The description of *A. drummondi* (Aud. and Bach., Quad. N. Amer., 1854, 166) I have since found to correspond so closely in every particular with the characters of these specimens, it seems far preferable to make them the basis of a full restoration of *drum-*

[4] About one and one-half times natural size.

mondi to a place in nomenclature. It may be stated that Richardson's *A. noveboracensis* (Raf.), the name under which that author described the type of *drummondi* was said by him to have come from the dry uplands of the Rocky Mountains inhabited by *A. xanthognathus*. This would indicate a locality far north of that from which my specimens came, also a less aquatic environment, and a somewhat different faunal region. Audubon and Bachman give, "Valleys of the Rocky Mountains," as the habitat of *drummondi*. More complete collections from the whole length of the intermediate country may show that the Lac La Hache animal is separable from the northern one; in such an event the name *microcephalus* may still be applicable to it.

Arvicola (Mynomes) drummondi. Topotype No. 418, ad. ♂, Coll. of S. N. Rhoads; Lac La Hache, B. Columbia, June 30th, 1892. Col. by S. N. R.

Description.—Size considerably less than that of *A. pennsylvanicus;* ears moderate; tail short and scantily haired; skull small, highly arched, compressed and elongate, the orbits much narrowed by the compression of the zygoma; eyes very small, as in *Pitymys*; feet as originally described by Richardson. Teeth of typical *Mynomes*, the postero-internal section of middle upper molars as large as its opposing outer triangle. Color above grizzled black-brown, beneath a clear hoary plumbeous, lacking the muddy wash mentioned by Aud. and Bach. Tail sooty above, grayer beneath.

Measurements.—Total length, 155 mm; tail vertebræ, 40; hind foot, 20 (average of four adults—Total, 153; tail, 39; foot, 19). Skull—Total length, 24·2; basilar length, 22; zygomatic width, 13·5; length of nasals, 6·6; incisor to post-palatal notch, 12·2; interorbital constriction, 4; length of mandible, 14·8; width of mandible, 8·2.

This species resembles *A. nanus*,[5] but its possession of a five triangled middle upper molar distinguishes it from that species, which, as Dr. Merriam expressly states, has but four triangles. The two specimens from Field show no differences from the one above described.

Incidental to this rather cursory study of the principal group of North American *Arvicolinæ* it is worthy of mention that the large vole captured by Mr. Drummond "at the foot of the Rocky Moun-

[5] Merriam, N. Amer. Fau., No. 5, 1891, 63.

tains," and described minutely by Richardson (Fau. Bor. Amer., 1829, 120), under caption of "*Arvicola riparius* (Ord?)," is almost certainly a member of the genus *Aulacomys*.[6] A comparison of the description of this animal given by Richardson and that given by Audubon and Bachman,[7] when they renamed it *A. richardsoni*, with my type of *Aulacomys arvicoloides*, leaves very little room for doubt that the two are generically the same. Their specific differences consist in the much longer tail of *arvicoloides*, its tail also being black above and nearly unicolor, its feet black, and the mouth and chops grayish-brown, like the surrounding parts.

An examination of Richardson's introductory notice of Mr. Drummond's travels, coupled with the statement that the specimen was taken in summer, fix the type locality of *A. richardsoni* within, say, fifty miles of Athabasca Pass in the Rocky Mountains, among the foothills traversed by the Columbia Portage trail connecting the head waters of the Athabasca, Saskatchewan, and Columbia Rivers, in latitude 53°. *A. arvicoloides* was taken somewhat east of the dividing ridge of the Cascade Mountains in latitude 47°. Should the correctness of this interpretation be proved, Drummond's specimen should stand as *Aulacomys richardsoni* (Dekay).[8]

[6] Rhoads, Amer. Nat., Feb. 1894, 182.
[7] Quad. N. Amer., III, 1853, 163.
[8] N. Y. Zool., I, 1842, 91.